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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/944,508	08/30/2001	Warren M. Farnworth	3393.6US (97-324.6)	4342

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EXAMINER

FULLER, ERIC B

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 08/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 09/944,508	<b>Applicant(s)</b> FARNWORTH, WARREN M.
	<b>Examiner</b> Eric B Fuller	<b>Art Unit</b> 1762

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2004.
- 2a) ☒ This action is **FINAL**.      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                                   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date: _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>1</u> .   | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Watts, Jr. et al. (US 6,276,589 B1) in view of Doran et al. (US 5,585,629).

Watts teaches a process where a continuous stream of charged solder droplets is produced (column 3, lines 40-45). Heaters are used to melt the solder in the reserve and maintain it in the liquid state while being ejected (column 3, lines 55-65). A piezoelectric crystal vibrator is used to induce a standing pressure wave on the solder, thus producing droplets (column 3, lines 50-55). When ejected, a charge is selectively applied to the solder droplets (column 4, lines 10-12). A variable bias is used to deflect some of the droplets in a certain dimension and onto a substrate (column 4, lines 15-30, column 7, lines 1-7). Additionally, some of the droplets are prevented from reaching the substrate as they are passed undeflected into a gutter. The deflection is programmably controlled (column 4, lines 13-34).

Watts explicitly teaches the limitations discussed, but fails to explicitly disclose deflection in two dimensions while not moving the substrate. However,

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Doran teaches the deflection of charged particles in two dimensions by the deflection plates of figure 4. The It would have been obvious at the time the invention was made to a person having ordinary skill in the art to use the deflection means taught by Doran in the process taught by Watts. By doing so, the need for substrate movement may be eliminated, resulting in less energy requirements, and/or the droplet placement is more easily and accurately controlled. Additionally, more areas of the substrate are able to receive solder (as has been discussed in prior office actions).

The dependent claims are taught, or made obvious, by Watts, as has been shown in previous Office Actions.

### ***Response to Arguments***

Applicant argues that it would not have been obvious, in looking at Watts alone, to use a duplication of parts in order to supply deflection in two dimensions over the single dimension taught by Watts. In support, the applicant argues that Watts teaches that the deflection is controlled by changing the amount of charge supplied to the droplet and not by changing the bias of the deflection plates. As such, the duplication of parts would result in less coverage of the substrate being achievable. This argument has been found persuasive. Particularly because "duplication of parts" does not infer that the voltage supplied to each pair of plates is individually varied. Accordingly, the examiner has withdrawn the rejections based on Watts alone.

Applicant fails to argue the rejections of Watts in view of Metz. However, the applicant has amended the claims such that they read that the substrate is located on a stationary support. It is the position of the examiner that this overcomes the rejection of Watts in view of Metz, as both Watts and Metz teach moving the substrate during deposition.

Applicant argues that the combination of Watts in view of Doran would not have been obvious. In support, the applicant argues that by adding the second dimension of deflection, the process would be limited in the achievable x and y range of deposition. This argument parallels that given for the rejection of Watts alone. However, for the case of Watts in view of Doran, this argument is not found convincing. The examiner suggests using the deflection means of Doran in the process of Watts. This would include the teaching in Doran that the voltages supplied to the pair of deflection plates are individually adjustable in order to precisely control the location of the deposition. Thus, the combination of Watts in view of Doran achieves the benefits of the substrate movement being eliminated while more areas of the substrate are able to receive solder.

Applicant argues that neither Watts nor Doran teaches that the substrate is on a stationary holder. This is not found convincing. Watts teaches that the degree of charge given to the droplet determines the extent of deflection of the droplet and Doran teaches that the two pairs of deflection plates accurately controls the placement of the droplets in two dimensions. In combination, one of ordinary skill would understand that since the magnitude and location of deflection may be controlled by these two factors, a maximum range of

deposition coverage may be achieved and, accordingly, substrate movement may be eliminated.

Applicant argues that a reasonable expectation of success is not achieved because Doran would destroy the teachings of Watts. This is not found persuasive. Doran only adds an improvement to the process taught by Doran. Doran teaches individually adjustable deflection plates that precisely control the location of the deposit in two dimensions. The proposed combination would act to increase, not decrease (as alleged by the applicant), the range of deposition. This is because Doran teaches that the pairs of plates are *individually adjustable*, thus allowing for precise placement of deposits over the entire surface of the substrate. Examiner agrees that the range would be decreased if the plates were not individually adjusted during deposition, as is suggested by the idea of "duplication of parts". However, it is proposed to use the deflection means of Doran in the process taught by Watts. This includes the individually adjusted plates. Controlling the amount of charge on the droplets, as taught by Watts, is still beneficial to the process taught by Watts in view of Doran. Therefore, the proposed combination does not destroy the teachings of Watts, only acts to improve it.

All other arguments have been considered, but are moot in view of the new grounds of rejection.

### ***Conclusion***

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Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric B Fuller whose telephone number is (571) 272-1420. The examiner can normally be reached on Mondays through Thursdays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P Beck, can be reached at (571) 272-1415. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
EBF  
**SHROVE P. BECK**  
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